



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/998,397	11/15/2001	Michael John Mayfield	AUS920010809US1	7312

7590 03/09/2005

Gregory W. Carr
Carr & Storm, L.L.P.
670 Founders Square
900 Jackson Street
Dallas, TX 75202

EXAMINER

THAI, TUAN V

ART UNIT	PAPER NUMBER
----------	--------------

2186

DATE MAILED: 03/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/998,397

Applicant(s)

MAYFIELD, MICHAEL JOHN

Examiner

Tuan V. Thai

Art Unit

2186

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5-8 and 12-15 is/are allowed.
- 6) ☒ Claim(s) 1-4 and 9-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 2186

Part III DETAILED ACTION

Specification

1. This office action responsive to communication filed November 15, 2001. Claims 1-15 are presented for examination.

2. Applicant is reminded of the duty to fully disclose information under 37 CFR 1.56.

Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-4 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hill et al. (USPN: 6,078,981); hereinafter Hill.

As per claim 1; Hill discloses the invention as claimed including a method of preventing system resource conflicts in a multiprocessor system (e.g. see abstract) comprises the steps of

Art Unit: 2186

comparing processor commands to prior snoops and detecting whether the addresses of these commands match said prior snoops' coherency blocks is equivalent taught as snoop commands are compared to determine whether any two agents snoop to the same address for detecting of the livelock condition (e.g. see column 2, lines 15 et seq.; column 3, lines 52-56, also see abstract); and delaying the sourcing of the snoop commands which do match is taught as when the both agents posts a bus transaction for the same data, the first agent stall the bus transaction until the first agent has completed its operation on the data (e.g. see abstract). Hill does in fact indirectly mention the stall period in which the owner agent must release its ownership to the requesting agent (e.g. see column 2, lines 8-10). Even though Hill discloses the invention as claimed, Hill does not particularly specifically indicate the predetermined window for the comparing and sourcing of the command during the livelock. In fact, Hill does indirectly mention the random stall period in which the owner agent must release its ownership to the requesting agent (e.g. see column 2, lines 8-10). Accordingly it would have been obvious to one having ordinary skill in the art at the time the current invention as made to specifically specify the stall period or timeframe for which the comparing the sourcing of the command during the livelock occurrence. In doing so, it would avoid the owner agent to unnecessarily extend its

Art Unit: 2186

ownership time that would leads to indefinite cycle or indefinite amount of time that the other waiting agents/processor must wait for the release of the ownership from the owner agent, therefore enhancing overall system throughput and reliability.

As per claim 2, the further limitation of the comparing and detecting includes applying a given set of arbitration rules to ascertain potential resource conflicts is taught by Hill as when livelock (potential resource conflicts) occurs, a "use one request" (a request for the data that identifies that the request is assigned a priority which is equivalent to "a given set of arbitration rule" as being claimed) is issued by core 200 to assure that the assigned agent has used the data least once to avoid livelock condition (e.g. see column 3, line 64 bridging column 4, line 4);

As per claim 3, Hill discloses the comparing and snoop sourcing occurs separately amongst first and second agents/processors of the multiprocessor system (e.g. see column 2, lines 15 et seq.); Hill further disclose when livelock condition occurs, the core processes all instruction which may be scheduled independently from the livelocked instruction (e.g. see column 4, lines 48-50);

As per claim 4, Hill discloses the comparing and snoop sourcing occurs in an bus sequencing unit 100 (as being equivalent to the claimed switch controller) (e.g. see figure 1,

Art Unit: 2186

column 3, lines 6 et seq.); .

As per claim 9, Hill discloses the invention as claimed including an apparatus for preventing system resource conflicts in a multiprocessor system (e.g. see abstract) comprises a plurality of processors (e.g. see column 1, lines 8-9, abstract); an intelligent switch is taught as bus sequence unit 100 connected to each of said plurality of processors for routing commands received from said processors (e.g. see figure 1, column 3, lines 6 et seq.); means for comparing processor commands to prior snoops and detecting whether the addresses of these commands match prior snoops coherency blocks is taught as snoop queue 160 performs cache coherency checking and fields requests from agents/processors and coordinates with the various caches present in the processor to determine whether a request implicates data held therein (e.g. see column 3, lines 52-56; also see column 2, lines 15 et seq); and means for delaying the sourcing of the snoop of commands which do match until the end of the specified window is taught as when the both agents posts a bus transaction for the same data, the first agent stall the bus transaction until the first agent has completed its operation on the data (e.g. see abstract). Hill does in fact indirectly mention the stall period in which the owner agent must release its ownership to the requesting agent (e.g. see column 2, lines 8-10). Even though Hill discloses the invention as claimed, Hill

Art Unit: 2186

does not particularly specifically indicate the predetermined window for the comparing and sourcing of the command during the livelock. In fact, Hill does indirectly mention the random stall period in which the owner agent must release its ownership to the requesting agent (e.g. see column 2, lines 8-10). Accordingly it would have been obvious to one having ordinary skill in the art at the time the current invention was made to specifically specify the stall period or timeframe for which the comparing the sourcing of the command during the livelock occurrence. In doing so, it would avoid the owner agent to unnecessarily extend its ownership time that would lead to indefinite cycle or indefinite amount of time that the other waiting agents/processor must wait for the release of the ownership from the owner agent, therefore enhancing overall system throughput and reliability.

As per claim 10, the further limitation of a given set of arbitration rules is used by the intelligent switch to ascertain potential resource conflicts is taught by Hill as when livelock (potential resource conflicts) occurs, a "use one request" (a request for the data that identifies that the request is assigned a priority which is equivalent to "a given set of arbitration rule" as being claimed) is issued by core 200 within the bus sequencing unit 100 to assure that the assigned agent has used the data least once to avoid livelock condition (e.g. see column 3, line 64 bridging column 4, line 4);

Art Unit: 2186

As per claim 11, Hill discloses the comparing and snoop sourcing occurs separately amongst first and second agents/processors of the multiprocessor system (e.g. see column 2, lines 15 et seq.); Hill further disclose when livelock condition occurs, the core processes all instruction which may be scheduled independently from the livelocked instruction (e.g. see column 4, lines 48-50);

Allowable subject matter

5. Claims 5, 8, 12 and 15 are allowable. The prior arts of record do not teach nor suggest, alone or in combination, all the limitation in the claims, particularly the determining of whether a command issued by a given processor is denoted to be a non-pipelined command and detecting whether any prior commands issued within a specified time defined window are non-pipelined commands and delaying the sourcing of a snoop of any such non-pipelined command if there is any other comparable non-pipelined command in the specified window. Claims 6-7 and 13-14 are also allowable since it is depended upon the indicated allowable claims 5 and 12 respectively.

Conclusion

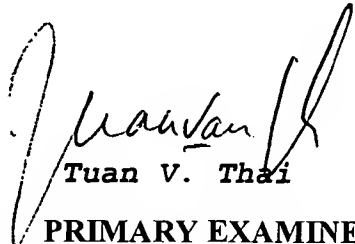
6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Art Unit: 2186

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan V. Thai whose telephone number is (571)-272-41287. The examiner can normally be reached from 6:30 A.M. to 4:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mathew M. Kim can be reached on (571)-272-4182. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVT/March 03, 2005


Tuan V. Thai
PRIMARY EXAMINER
Group 2100